REMARKS

The undersigned attorney wishes to thank the Examiner for the courtesies extended during the Interview. During the Interview, the Examiner agreed to maintain the pendency of the present application. In return, we agreed to cancel any claims in the present application that are identical (in the statutory double patenting sense) to claims deemed allowable in the parent application (Application Serial No. 09/504,393, filed February 15, 2000), namely claims 6, 10-15, 19-32 and 34-36 of the parent application. (*See* Paper No. 24 and the Response to Office Action Including Amendment and Statement of Interview dated January 21, 2004 from the prosecution history of the '393 application).

Claims 8, 9, 28-30 and 34-36 have been cancelled, without prejudice.

Claims 6, 19 and 31 have been amended to specify that the recited polynucleotide encodes --a polypeptide having β,β-carotene 15,15'-monooxygenase activity comprising SEQ ID NO: 1 or a polypeptide having β,β-carotene 15,15'-monooxygenase activity and being at least 80% homologous to SEQ ID NO: 1 as determined by the Wisconsin Sequence Analysis Package GCG, Version 9.1 (1997)--. Support for this amendment is found in original claims 1, 3, 6, 19 and 31 and in the specification at, for example, page 8, para. 0035; page 9, para. 0040; and pages 12-13, paras. 50-52. *See, In re Gardner*, 177 USPQ 396, 397 (CCPA 1973) and MPEP §§ 608.01(o) and (l).

Claim 11 has been amended to recite "[a]n isolated nucleic acid sequence comprising an antisense ribonucleic acid, which binds to the nucleic acid sequence

according to claim 6." Support for this amendment is found in original claim 11 and in the specification at, for example, page 10, para. 0041. (*Id.*).

Claim 37 has been added. Support for this claim is found in original claims 1, 4 and 6, and in the specification at, for example, page 8, para. 0035 and page 9, para. 0040. (*Id.*).

The Examiner's renumbering of claims beginning at the second occurrence of claim 27, with dependencies changed accordingly, is hereby acknowledged. (*See* Paper No. 10 at 2).

It is submitted that no new matter has been introduced by the foregoing amendments. Approval and entry of the amendments is respectfully solicited.

Priority Benefit

The Examiner denied the current application benefit under 35 USC §120 to its parent application, Application Serial No. 09/504,393. In denying priority benefit, the Examiner asserted that

> Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 USC § 120.... the disclosure of the invention in the parent and in the second application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. *See Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ 2d 1077 (Fed. Cir. 1994)" (Paper No. 10 at 2-3).

The Examiner further asserted that "[t]he parent application, 09/504,393, does not disclose a polypeptide having β,β-carotene 15,15'-monooxygenase oxidase [activity], making said enzyme or using said enzyme, which is claimed in the instant application." (*Id.* at 3).

As is well accepted, the claims of an application are entitled to the benefit of the filing date of an earlier filed U.S. patent application if the subject matter of the claims is disclosed in accordance with 35 USC §112, first paragraph, in the earlier filed application. *Transco Products, Inc. v. Performance Contracting, Inc.*, 32 USPQ 2d 1077, 1080-81 (Fed. Cir. 1994); *Kennecott Corp. v. Kyocera International Inc.*, 5 USPQ2d 1194, 1196 (Fed. Cir. 1987); *see also* MPEP §2163.03(II) at 2100-172, ed. 8 rev. 1 (Feb. 2003).

Initially, we note that the Examiner's "priority" conclusion is entirely devoid of any formal analysis whatsoever. The Examiner has failed to clearly articulate which of the requirements under 35 USC §112, first paragraph (*i.e.*, written description, enablement, or best mode), are allegedly not met by the disclosure of the parent application. For example, the Examiner has not presented any evidence that she has carried out the required analysis in connection with the written description requirement as set forth in the Guidelines for the Examination of Patent Applications Under the 35 USC § 112, para. 1 "Written Description" Requirement, MPEP §2163.03 at 2100-172-78, ed. 8 rev. 1 (Feb. 2003); the enablement requirement as set forth in Burden on the Examiner Under the Enablement Requirement, MPEP §2164.04 at 2100-182-83, ed. 8 rev. 1 (Feb. 2003); or the best mode requirement as set forth in Considerations Relevant to Best Mode and Requirements for Rejection for Lack of Best Mode, MPEP §2165.01 and 03, at 2100-194-96, ed. 8 rev. 1 (Feb. 2003). The Examiner has not even construed the claims as written, which is an essential step in determining compliance with any of the requirements of 35 USC §112, first paragraph. For this reason alone, the denial of benefit should be withdrawn.

Further, the Examiner has improperly shifted the burden of showing compliance with the requirements of 35 USC §112, first paragraph, to the applicants. The Examiner has the burden to set forth a *prima facie* case by establishing why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention recited by the claims. *In re Wertheim*, 191 USPQ 90, 97 (CCPA 1976) and *Ex parte Chen*, 2002 WL 87963, *3 (unpublished) (BPAI 2002) or a reasonable basis to question the enablement provided for the claimed invention. *See In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). Also, as set forth in MPEP §2165.03:

> The examiner should presume that the best mode is disclosed in the application, unless evidence is presented that is inconsistent with that presumption. It is extremely rare that a best mode rejection properly would be made in *ex parte* prosecution.

However, the Examiner has not presented any evidence that this presumption should be ignored. Accordingly, it is submitted that the Examiner has impermissibly shifted the burden to Appellants to prove compliance with 35 USC §112, first paragraph. Such a burden shifting flies in the face of the clear requirement that the Examiner has the initial burden to set forth a *prima facie* case in view of the claims as written. For this reason also, the denial of benefit should be withdrawn.

The Examiner's sole contention in support of the "priority" rejection is that the parent application "does not disclose a polypeptide having β,β-carotene 15,15'-monooxygenase oxidase, making said enzyme or using said enzyme, which is claimed in the instant application." (*Id.* at 3). It is respectfully submitted that the Examiner has improperly fixated on the ***name*** of the claimed compound. The Examiner has not

identified any authority that supports a conclusion that not disclosing the ***name*** of a claimed compound (*i.e.*, "β,β-carotene 15,15'-monooxygenase oxidase") in a parent application is sufficient to deny priority benefit. However, this was the Examiner's burden.

The name of the enzyme is an inherent property of the enzyme correctly identified in both the present claims and the disclosure of the parent application by SEQ ID NO: 1. Accordingly, merely changing the name of the enzyme identified by SEQ ID NO: 1 is insufficient to deny priority benefit of the parent application. *See* MPEP §2163.07(a) at 2100-177 ed. 8 rev. 1 (Feb. 2003); *Kennecott Corp. v. Kyocera International, Inc.* 5 USPQ2d 1194, 1198 (Fed. Cir. 1987) (Patent which issued from a ***continuation-in-part ("CIP") application which added a new term***, "equiaxed microstructure" to the claims, which term was not present in the parent application, was entitled to priority benefit of the filing date of the parent application: "The disclosure in a subsequent patent application of an inherent property of a product ***does not deprive that product of the benefit of an earlier filing date***. Nor does the inclusion of a description of that property in later-filed claims change this reasonable result."); *Acme Highway Prod. v. D.S. Brown Co.*, 167 USPQ 129 (6th Cir. 1970) ("The law makes clear that ***subject matter may be added to an application by way of amendment or by continuation-in-part application, without impairment to the right of the original filing date,*** where the added subject matter is 'something that might be fairly deduced from the original application.'"); *In re Papesch*, 137 USPQ 43, 51 (CCPA 1963) ("From the standpoint of patent law, a compound and all of its properties are inseparable; they are one and the same thing."); and *In re Nathan*, 140 USPQ 601, 604 (CCPA 1964)

(later added limitation to the claims of a 2-halo substituent as "alpha-oriented" was an "inherent characteristic" of the claimed subject matter).

Applicants submit that the parent application discloses and the instant claims recite the enzyme correctly and properly by its structure: the sequence of SEQ ID NO: 1. Moreover, the name of the enzyme in the parent specification does ***not*** alter its correctly disclosed substrate, substrate specificity, and resulting cleavage products. Thus, whether the enzyme having the amino acid sequence of SEQ ID NO: 1 is called by different name in the instant claims and in the parent is irrelevant to the data presented in the parent specification regarding the observed - and unchanged - physical/kinetic characteristics of the polypeptide defined by SEQ ID NO: 1. For these reasons also, the denial of benefit should be withdrawn.

Further, we note that the Examiner's "priority" rejection is wholly inconsistent with the Examiner's rejections under 35 USC §§ 102(a), (b) and 103(a), particularly with regards to the Examiner's reliance on the disclosure of an "oxygenase that is 100% identical to SEQ ID NO: 2" in Wyss *et al.*, "Cloning and expression of β,β-carotene 15,15'-***di***oxygenase," *Biochem. Biophy. Res. Com.* 10;271(2):334-6 (May 2000) ("Wyss"). (Paper No. 10 at 8-12).

As is well accepted, a proper anticipatory prior art reference must be enabling and have placed the allegedly anticipatory teaching in possession of the public. *Scripps Clinic v. Genentech Inc.*, 18 USPQ2d 1001, 1011 (Fed. Cir. 1991) (whether a prior art reference "was enabling and placed the purported anticipatory teaching... in possession of the public" was a disputed fact issue bearing on patent invalidity.); *Akzo N.V. v. International Trade Commission*, 1 USPQ2d 1241, 1245 (Fed.

Cir. 1986) ("the prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public"); *In re Brown*, 141 USPQ 245, 249 (CCPA 1964) ("the true test of any prior art relied on to show or suggest that a chemical compound is old, is whether the prior art is such as to place the disclosed 'compound' in the possession of the public.").

Accordingly, if Wyss, which discloses a ***di***oxygenase, is a proper anticipatory reference as suggested by the Examiner, then it follows that Wyss must properly enable and place the public in possession of the alleged anticipatory teaching (*i.e.*, a ***mono***oxygenase) as recited in the instant claims. (*See* Paper No. 10 at 8). Therefore, using the same logic, it follows that the parent application, which also discloses a ***di***oxygenase must enable and place the public in possession of the ***mono***oxygenase recited in the present claims. Thus, the instant claims should be entitled to the benefit of the filing date of the parent application, which would antedate Wyss and remove it as an anticipatory reference. Conversely, if the instant claims, which recite "monooxygenases," are not entitled to priority benefit of the filing date of the parent application, which discloses "dioxygenase," then it follows that Wyss, which discloses a "dioxygenase" is not enabled and cannot anticipate the instant claims, which recite "monooxygenase." *See Paperless Accounting v. Bay Area Rapid Transit System*, 231 USPQ 649, 653 (Fed. Cir. 1986) (if a claim is not entitled to benefit of a parent application, then a "corresponding foreign application that is substantially the same [as the parent application] is also insufficient to anticipate such a claim under §102(b).")

For this reason also, the denial of benefit should be withdrawn.

Although believed unnecessary, we discuss below evidence of record, not considered by the Examiner, showing that the claims of the present application are fully supported by the disclosure of the parent application in accordance with the requirements of 35 USC §112, first paragraph (*i.e.*, written description, enablement, and best mode).

Written Description

In order for the claims of the instant application to receive the benefit of the parent application, the claims must be supported by the disclosure of the parent application in compliance with the written description requirement of 35 USC §112, first paragraph. *Kennecott Corp.*, 5 USPQ2d at 1196-97. This requirement insures that the inventor had possession of the later claimed invention on the filing date of the earlier application. (*Id.*).

An applicant may show possession of a claimed invention in many ways, including through disclosure of drawings or structural chemical formulas that are sufficiently detailed to show that the applicant was in possession of the claimed invention as a whole. *Vas-Cath, Inc. v. Muhurkar*, 935 F.2d 1555, 1564-65, 19 USPQ2d 1111, 1117-18 (Fed. Cir. 1991).

With respect to claims reciting polynucleotides, "an adequate written description of a DNA ... 'requires precise definition, such as by structure, formula, chemical name, or physical properties, ...'" *Regents of the University of California v. Eli Lilly and Co.*, 43 USPQ2d at 1404 (quoting *Fiers v. Revel*, 25 USPQ2d 1601, at 1606 (Fed. Cir. 1993). The written description requirement is met for a claimed

polynucleotide if the polynucleotide is completely described in the specification by its chemical structure, *i.e.*, nucleotide sequence. *See Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 65 USPQ2d 1385, 1398, nt. 7 (Fed. Cir. 2003) ("Indeed, Amgen's patents appear to satisfy the sequence requirement in Eli Lilly insofar as Figure 6 of the patents expressly discloses the complete (albeit slightly incorrect) sequence of human genomic EPO DNA and the encoded DNA.") and *Ex parte Reinherz*, 2002 WL 31003016, *2 (unpublished) (BPAI 2002) ("The best way of complying with the written description requirement, perhaps the only way, is to set forth the precise sequence of nucleotides that make up the claimed genetic material.").

The claims, as written, all recite complete nucleotide structures described in Figures 3 and 4 (*e.g.*, SEQ ID NOs: 1, 2, 8, 9 and 10) of the parent application and in the Sequence Listing filed concurrently with the parent application. The Table below identifies each sequence recited in the pending claims:

Claim No.	Sequence Identifier Recited
6, 10-15, 19-27, 31 and 32	SEQ ID NO: 1
7	SEQ ID NO: 2

As noted above, the complete structures of SEQ ID NOs: 1 and 2 are set forth in the parent application. *See*, *e.g.*, Figures 3 and 4 and the Sequence Listing filed with the parent application. The parent also describes SEQ ID NO: 2 as a cDNA sequence with a length of 3090 base pairs (excluding the polyA tail beginning at position 3073) having 132 base pairs of 5'-nontranslating sequence, a coding sequence of 1578 base pairs and a 3'-nontranslating sequence of 1380 base pairs.

(Specification, p. 4, lns. 14-18). Furthermore, Example 4 of the parent describes how the full length cDNA was cloned. (*Id.*, p. 18, ln. 13 - p. 22, ln. 29). The parent also describes the chemical structure of the polypeptide sequence derived from the coding region of SEQ ID NO: 2. This amino acid sequence is described as having 526 amino acid residues. (*Id.*, p. 4, lns. 20-22).

In view of the foregoing, under the *Lilly* case and its progeny, because each claim recites a complete structure or a family of closely related structures that share a high degree of homology to structures that are fully disclosed in the parent application, each claim is in compliance with the written description requirement. See also the PTO's own SYNOPSIS OF APPLICATION OF WRITTEN DESCRIPTION GUIDELINES, in particular Example 8 concluding that a claim reciting: "An isolated and purified nucleic acid comprising SEQ ID NO: 2." complies with the written description requirement.

Accordingly, because the instant claims are fully described in the parent application in accordance with the written description requirement of 35 USC §112, first paragraph, the instant application is entitled to priority benefit of the filing date of the parent application. For this reason also, the denial of benefit should be withdrawn.

Enablement

In order for the claims of the instant application to receive the benefit of the parent application, the claims must be supported by the disclosure of the parent application in compliance with the enablement requirement of 35 USC §112, first paragraph. *Kennecott Corp.*, 5 USPQ2d at 1196-97.

As is fundamental, the claimed invention must be described in sufficient detail to enable a person skilled in the relevant art to make and use the full scope of the claimed invention without undue experimentation. *See* 35 USC §112, first paragraph. The Federal Circuit set forth the factors to be considered in an enablement determination, the so-called Wands factors, in a case involving hybridoma technology for producing hepatitis B-surface antigen determinants:

> The factors to be considered have been summarized as the quantity of experimentation necessary, the amount of direction or guidance presented, the presence or absence of working examples, the nature of the invention, the state of the prior art, the relative skill of those in that art, the predictability or unpredictability of the art and the breadth of the claims. *In re Wands,* 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

In *Wands*, the Federal Circuit reversed the Board (and the Examiner) and held that screening large numbers of hybridoma cell lines looking for a "positive" cell line was not undue experimentation even though the expected number of "positive" cell lines would be low compared to the high number of hybridoma cells that had to be screened (thousands or more). (*Id.* at 1406-07).

It is well accepted that even a "considerable amount" of experimentation is permissible as long as it is merely routine or if the specification provides a reasonable amount of guidance. MPEP §2164.06 and *In re Wands*, 8 USPQ at 1404. Further, as the Federal Circuit Court has recently stated, "[t]he enablement requirement is often more indulgent than the written description requirement." *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 65 USPQ2d at 1399.

As discussed in detail above in addressing the written description requirement, the claims that are pending and under examination, all recite complete nucleotide structures or a family of structures that share a high degree of homology to the nucleotide to the nucleotide structures described in Figures 3 and 4 (*e.g.*, SEQ ID NOs: 1, 2, 8, 9 and 10) of the parent application and in the Sequence Listing filed concurrently with the parent application. The parent also describes SEQ ID NO: 2 as a cDNA sequence with a length of 3090 base pairs (excluding the polyA tail beginning at position 3073) having 132 base pairs of 5'-nontranslating sequence, a coding sequence of 1578 base pairs and a 3'-nontranslating sequence of 1380 base pairs. (pg. 4, lns. 14-18). The parent also describes the chemical structure of the polypeptide sequence derived from the coding region of SEQ ID NO: 2. This amino acid sequence is described as having 526 amino acid residues. (pg. 4, lns. 20-22). Furthermore, the parent application discloses how to make the full length cDNA (SEQ ID NO: 2) using specific primers (SEQ ID NOs: 8, 9 and 10) and how to express it. *See, e.g.*, Example 4. The parent application also discloses that the polypeptide whose sequence is set forth in SEQ ID NO: 1 is a participant in the pathway leading to the production of vitamin A (*e.g.*, pp. 7-8, para. 0033) and is able to cleave carotene molecules (*e.g.*, pg. 12, para. 0049); and that the polynucleotide whose sequence is set forth in SEQ ID NO: 2 may be used to produce transgenic plants (pg. 13, para. 0052).

The Examiner has not contended – and cannot contend – that one skilled in the art could not make either the polynucleotide sequence (SEQ ID NO: 2) or the encoded polypeptide (SEQ ID NO: 1) given the description of the sequences in the application. Further, the parent application discloses how to identify polypeptides that

are at least 80% or 90% homologous to SEQ ID NO: 1 using the Wisconsin Sequence Analysis Package GCG, Version 9.1 (1997). *See, e.g.*, pg. 7, ln. 26 to pg. 8, ln. 12.

It is respectfully submitted that, based on the foregoing, the parent application provides ample guidance and numerous working examples that would enable one of skill in the art to practice the claimed invention without undue experimentation. Accordingly, the instant application is entitled to priority benefit of the filing date of the parent application. For this reason also, the denial of benefit should be withdrawn.

Best Mode

Initially, we note that the sole legal authority identified by the Examiner to support the denial of benefit conclusion concerns compliance with the best mode requirement. In *Transco Products*, the court held that updating the best mode upon filing a continuing application is "completely contrary to current continuing application practice" and further, that the proper date for determining compliance with the best mode requirement is the filing date of the parent application. 32 USPQ2d at 1083. Accordingly, it is respectfully submitted that applicants are not required to update the best mode of the claimed invention.

Further, as noted above:

> The examiner should presume that the best mode is disclosed in the application, unless evidence is presented that is inconsistent with that presumption. It is extremely rare that a best mode rejection properly would be made in *ex parte* prosecution. MPEP §2165.03

Here, the Examiner has not presented any evidence that this presumption should be ignored. It is respectfully submitted that absent any evidence to the contrary, the parent application fully discloses the best mode for practicing the claimed invention. Accordingly, the instant application is entitled to priority benefit of the filing date of the parent application. For this reason also, the denial of benefit should be withdrawn.

Objections to the Claims

Claims 6 and 19 were objected to "as being dependent upon a non-elected base claim." (Paper No. 10 at 3). With a view towards furthering prosecution, claims 6 and 19 have been amended to be independent claims and to incorporate the elements recited in claim 1. Accordingly, it respectfully is submitted that the objection is rendered moot and should be withdrawn.

Claims 8 and 9 were objected to under 37 CFR 1.75(c), "as being of improper dependent form for failing to further limit the subject matter of a previous claim." (*Id.* at 4). The Examiner further stated that claims 8 and 9 "do not include the limitation of the claim on which it depends because a DNA of 20 bases cannot encode a polypeptide that is more than 60% identical to SEQ ID NO: 1." (*Id.*).

With a view towards furthering prosecution, claims 8 and 9 have been cancelled, without prejudice. Accordingly, the objection is rendered moot and should be withdrawn.

§112, Second Paragraph Rejection

Claims 8, 9, and 11 were rejected under 35 USC §112, second paragraph. (Paper No. 10 at 7). In making the rejection, the Examiner asserted that fragments of 20 and 30 base pairs, as recited by claims 8 and 9 respectively, "are unclear because ... [the fragments] cannot encode an enzyme that is more than 60% identical to SEQ ID NO: 1." (*Id.*).

With a view toward furthering prosecution, claims 8 and 9 have been cancelled, without prejudice. Accordingly, the rejection is rendered moot and should be withdrawn.

The Examiner further asserted that claim 11 is "unclear because an antisense by definition does not encode a polypeptide but is complimentary to a mRNA of a polypeptide." (*Id.*). With a view towards furthering prosecution, claim 11 has been amended to clarify that the nucleic acid sequence is "an antisense ribonucleic acid, which binds to the nucleic acid sequence according to claim 6." In view of this amendment, it respectfully is submitted that the rejection is rendered moot and should be withdrawn.

§112, First Paragraph- Written Description Rejection

Claims 8 and 9 were rejected under 35 USC §112, first paragraph, "as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention." (Paper No. 10 at 4). In making the rejection, the Examiner asserted that "[a]pplicants fail to describe any

representative species by identifying characteristics or structural properties other than the functionality of being a β,β-carotene 15,15'-dioxygenase oxidase." (*Id.* at 5).

With a view towards furthering prosecution, claims 8 and 9 have been cancelled, without prejudice. Accordingly, the rejection is rendered moot and should be withdrawn.

§112, First Paragraph- Enablement Rejection

Claims 6-15 and 19-27 were rejected under 35 USC §112, first paragraph. (Paper No. 10 at 5). In making the rejection, the Examiner acknowledged that the specification is enabling for DNA molecules encoding SEQ ID NO: 1. (*Id.*). The Examiner, however, asserted that the specification "does not reasonably provide enablement for any DNA or DNA fragments encoding a β,β-carotene 15,15'-dioxygenase having 60% homology to SEQ ID NO: 1 or comprising 20 or 30 bases of SEQ ID NO: 2." (*Id.*). The Examiner further asserted that "the breadth of these claims is much larger than the scope enable [sic] by the specification" because "applicants do not teach which 60% of SEQ ID NO: 1 must be retained and which 40% of SEQ ID NO: 1 can be modified" and still obtain a functional enzyme. (*Id.* at 6). The Examiner also asserted that "it is unpredictable whether a DNA fragment comprising 20 or 30 bases ... encodes a functional enzyme." (*Id.*).

With a view towards furthering prosecution, claims 8 and 9 have been cancelled, without prejudice. Accordingly, the rejection with regards to these claims is rendered moot and should be withdrawn.

Claims 6 and 19 have been amended to recite a polypeptide "being ***at least 80% homologous*** to SEQ ID NO: 1 as determined by the Wisconsin Sequence Analysis Package GCG, Version 9.1 (1997)."

We identify below, consistent with the Federal Circuit's *In re Wands* decision, facts which support the conclusion that it would ***not*** require undue experimentation to make or use a polypeptide "being ***at least 80% homologous*** to SEQ ID NO: 1" as recited in amended claims 6 and 19.

We note that the claims and the specification specify that homology is determined using the Wisconsin Sequence Analysis Package GCG, Version 9.1 (1997). (*See e.g.*, page 8, para. 0035; page 9, para. 0040). Use of such computer programs to determine homology is well known and does not require undue experimentation. Further, the level of skill in this art is very high. This is a fundamental technology that is frequently used in the lab.

In view of the foregoing, one skilled in this art could readily determine if a polypeptide is "***at least 80% homologous*** to SEQ ID NO: 1" using the Wisconsin Sequence Analysis Package GCG, Version 9.1 (1997). Accordingly, the specification enables the full scope of the amended claims, and consequently, the rejection should be withdrawn.

§102(b) Rejection

Claims 6-10, 12-15, 19, 21, 24, 26-32 and 34-36 were rejected under 35 USC §102(b) as anticipated by Wyss *et al.*, "Cloning and Expression of β,β-carotene

15,15'-dioxygenase." *Biochem. Biophy. Res. Com.* 10;271(2):334-6 (May 2000) ("Wyss"). (Paper No. 10 at 8).

Wyss discloses cloning a full-length cDNA for β,β-carotene 15,15'-dioxygenase, expression of the enzyme in *E. coli* and baby hamster kidney cells, and characterization of the enzyme. (*See* pp. 334-35)

In making the rejection, the Examiner asserted that Wyss "teach[es] a nucleic acid molecule that is 100% identical to SEQ ID NO: 2. The encoded oxygenase is 100% identical to the oxygenase of SEQ ID NO: 1 (pages 334-336). The nucleic acid sequence of Wyss *et al.* and the nucleic acid sequence of the instant invention encode the same enzyme." (*Id.*) The Examiner further contended that Wyss "teach[es] fragments, primer/probes and kits comprising said primer/probes" and "a method of introducing said nucleic acid sequence into a mammalian and prokaryotic host cell, a vector comprising said nucleic acid sequence and a host cell transformed with said vector." (*Id.*)

With a view towards furthering prosecution, claims 8, 9 and 30 have been cancelled, without prejudice. Accordingly, the rejection with regards to these claims is rendered moot and should be withdrawn.

As discussed in detail above, the present claims are entitled to priority benefit under 35 USC §120 of the parent application, filed February 15, 2000.[1/] We note that Wyss was received by the journal on March 29, 2000 (pg. 334) and, according to the Notice of References Cited accompanying the office action (Paper No. 10), was

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1/ We note that the parent application is entitled to priority benefit under 35 USC §119 to the foreign counterpart application EP 99103382, filed February 22, 1999. Accordingly, the earliest priority date available for the instant claims is February 22, 1999.

published on May 10, 2000. It is submitted that the filing date of the parent application, to which the present claims are entitled priority benefit, antedates the effective date of Wyss as a reference. Accordingly, the rejection is rendered moot and should be withdrawn.

§102(a) Rejections

Claims 6-10 and 28-30 were rejected under 35 USC §102(a) as being anticipated by Leuenberger *et al.*, "The Reaction Mechanism of the Enzyme-Catalyzed Central Cleavage of Beta-carotene to Retinal." *Angew Chem. Int. Ed. Engl.* 40(14):2613-17 (July 16, 2001) ("Leuenberger"). (Paper No. 10 at 9).

Leuenberger discloses purification of an enzyme catalyzing the central cleavage of β-carotene from baby hamster kidney cells. (pg. 2614). The substrate specificity of the enzyme was investigated, which revealed several non-symmetrical carotenoids cleaved by the enzyme. The discovery of these non-symmetrical carotenoids allowed the researchers to distinguish between a monooxygenase and dioxygenase mechanism of action. (*Id.*). Using these non-symmetrical carotenoids the researchers determined that the enzyme uses a monooxygenase mechanism. (*Id.* at 2615).

In making the rejection, the Examiner asserted that Leuenberger "teach[es] a nucleic acid molecule that is 100% identical to SEQ ID NO: 2. The encoded oxygenase is 100% identical to the oxygenase of SEQ ID NO: 1 (pages 334-336 [sic]). Therefore, the nucleic acid sequence of Wyss [sic] *et al.* comprises of SEQ ID NO: 2 and fragments of SEQ ID NO: 2." (*Id.*) The Examiner then summarily

concluded that "the teachings of Leuenberger *et al.* anticipate claims 6-10 and 28-30." (*Id.*)

With a view towards furthering prosecution, claims 8, 9 and 30 have been cancelled, without prejudice. Accordingly, the rejection with regards to these claims is rendered moot and should be withdrawn.

As is well settled, anticipation requires "identity of invention." *Glaverbel Societe Anonyme v. Northlake Mktg. & Supply,* 33 USPQ2d 1496, 1498 (Fed. Cir. 1995). Each and every element recited in a claim must be found ***in a single prior art reference*** and arranged as in the claim. *In re Marshall*, 198 USPQ 344, 346 (CCPA 1978); *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Co.,* 221 USPQ 481, 485 (Fed. Cir 1984). Initially, we note that the Examiner cites to Leuenberger as well as to pages 334-36 of Wyss in support of the anticipation rejection. (Paper No. 10 at 9). This is contrary to the established precedent cited above. For this reason alone, the rejection should be withdrawn.

Furthermore, in a §102(a) rejection there must be no difference between what is claimed and what is disclosed in the applied reference. *In re Kalm*, 154 USPQ 10, 12 (CCPA 1967); *Scripps v. Genentech Inc.*, 18 USPQ2d at 1010. It is incumbent upon the Examiner to ***identify wherein each and every facet*** of the claimed invention is disclosed in the applied reference." *Ex parte Levy*, 17 USPQ2d 1461, 1462 (BPAI 1990). The Examiner is required to point to the disclosure in the reference "***by page and line***" upon which the claim allegedly reads. *Chiong v. Roland*, 17 USPQ2d 1541, 1543 (BPAI 1990).

Here, the rejection fails to identify where in Leuenberger each and every element of claims 6-10 and 28-30 is shown. All that the rejection states is that Leuenberger "teach[es] a nucleic acid molecule that is 100% identical to SEQ ID NO: 2," and "[t]he encoded oxygenase is 100% identical to the oxygenase of SEQ ID NO: 1 (pages 334-336)." Pages 334-36 of Leuenberger do not exist. We presume that the Examiner is referring to pages 334-36 of Wyss. This is insufficient as a matter of law to support a conclusion of anticipation, and for this reason also, the rejection should be withdrawn.

Further, as discussed in detail above, the present claims are entitled to priority benefit under 35 USC §§ 119 and 120 to the February 22, 1999 filing date of the EP 99103382 application. We note that Leuenberger was published on July 16, 2001. Therefore, Leuenberger is not prior art to the presently claimed invention. Accordingly, the rejection is rendered moot and should be withdrawn.

Claims 6-10, 12-15, 19, 21, 24, 26-32 and 34-36 were rejected under 35 USC §102(a) as being anticipated by Wyss *et al.*, "Expression Pattern and Localization of *β,β*-carotene 15,15'-dioxygenase in Different Tissues." *Biochem. J.* 354:521-29 (March 15, 2001) ("Wyss II"). (Paper No. 10 at 9).

Wyss II discloses obtaining partial amino acid sequences of β,β-carotene 15,15'-dioxygenase from extracts of chicken intestinal mucosa. (pg. 524). The partial sequences were used to obtain a full-length cDNA coding for β,β-carotene 15,15'-dioxygenase. (pp. 524-25). The cDNA was sequenced and the deduced polypeptide sequence encoded by the coding sequence of the cDNA was aligned with other known β,β-carotene 15,15'-dioxygenases to determine homology. (*Id.*). The protein was

expressed in several eukaryotic cell lines and the expression pattern of the protein was studied in selected chicken tissues. (pp. 526-28).

In making the rejection, the Examiner asserted Wyss II "teach[es] a nucleic acid molecule that is 100% identical to SEQ ID NO: 2. The encoded oxygenase is 100% identical to the oxygenase of SEQ ID NO: 1 (pages 522-525). The nucleic acid sequence of Wyss [II] and the nucleic acid sequence of the instant invention encode the same enzyme." (*Id.* at 10).

The Examiner further contended Wyss II "teach[es] fragments, primer/probes and kits comprising said primer/probes... [and] primers that are 100% identical to the primers of SEQ ID NO:8, 9 and 10 (page 522). Therefore, the nucleic acid sequence of Wyss [II] *et al.* comprises of [sic] SEQ ID NO: 2 and fragments of SEQ ID NO: 2." (*Id.*)

The Examiner further contended that Wyss II "teach[es] a method of introducing said nucleic acid sequence into a mammalian cell, a vector comprising said nucleic acid sequence and host cell transformed with said vector (pages 526)." (*Id.*). The Examiner then concluded that "the teachings of Wyss *et al.* anticipate claims 6-10, 12-15, 19, 24, 26-32 and 34-36." (*Id.*).

With a view towards furthering prosecution, claims 8, 9, 28-30 and 34-36 have been cancelled, without prejudice. Accordingly, the rejection with regards to these claims is rendered moot and should be withdrawn.

As discussed in detail above, the present claims are entitled to priority benefit under 35 USC §§ 119 and 120 to the filing date of EP 99103382 (February 22, 1999). We note that according to the Notice of References Cited accompanying the

office action (Paper No. 10), Wyss II was published on May 15, 2001. Thus, Wyss is not prior art to the presently claimed invention. Accordingly, the rejection is rendered moot and should be withdrawn.

§103 Rejections

Claims 19-27 and 31-32 were rejected under 35 USC §103 as unpatentable over Wyss in view of Santerre *et al.*, U.S. Patent No. 4,727,028 ("Santerre"). (Paper No. 10 at 11).

The disclosure of Wyss is set forth above.

Santerre discloses recombinant DNA and expression vectors that confer hygromycin B and/or G418 resistance to eukaryotic and prokaryotic host cells. (Abstract).

In making the rejection, the Examiner asserted that Wyss "teach[es] a nucleic acid molecule that is 100% identical to SEQ ID NO: 2 of the instant invention, as discussed above." (*Id.*). The Examiner acknowledged, however, that "[t]he difference between the reference of Wyss *et al.* and the instant invention is that the reference of Wyss *et al.* does not teach a method of introducing said nucleic acid molecule into a plant host cell, a yeast or fungal host cell, an alga host cell or a human host cell." (*Id.*).

To fill the acknowledged gap, the Examiner asserted that Santerre teaches "methods of transforming plant host cells, yeast or fungal host cells, alga host cells or human host cells (columns 14-15 and 17-33 and claims 1-111)." (*Id.*).

The Examiner further contended that "it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to introduce

the nucleic acid molecule of Wyss *et al.* into various host cells as taught by Santerre *et al.* The motivation of using the method of Santerre *et al.* is to efficiently produce the recombinant enzyme rather than by standard biochemical purification methods. One of ordinary skill in the art would have had a reasonable expectation of success since expression of heterologous proteins in prokaryotic and eukaryotic host cells are performed routinely in the art." (*Id.* at 11-12).

As discussed in detail above, the present claims are entitled to priority benefit under 35 USC §§ 119 and 120 to the filing date of EP 99103382 (February 22, 1999). Thus, Wyss is not prior art to the present claims. Because the primary document relied upon by the Examiner is not prior art, the rejection is untenable and should be withdrawn.

Claims 6 and 11 were rejected under 35 USC §103 as unpatentable over Wyss in view of Takayama *et al.*, "Antisense RNA," *Crit. Rev. Biochem. Mol. Biol.* 25(3) (1990) ("Takayama") (Paper No. 10 at 12).

The disclosure of Wyss is set forth above.

Takayama is a review article that discloses a broad overview of natural and artificial antisense RNA-mediated regulation. (Introduction).

In making the rejection, the Examiner contended that Wyss "teach[es] a nucleic acid sequence of SEQ ID NO: 2 encoding a protein having the amino acid sequence of SEQ ID NO: 1, as discussed above." (*Id.*)

The Examiner acknowledged, however, that "[t]he difference between the reference of Wyss *et al.* and the instant invention is that the reference of Wyss *et al.* does not teach an antisense of SEQ ID NO: 2." (*Id.*)

To fill the acknowledged gap, the Examiner relied on Takayama as teaching "that an antisense RNA can be used to block transcription of a specific gene, thereby inhibiting expression of a functional enzyme (page 155, 1st paragraph)." (*Id.*). The Examiner further stated "[t]heir use in the art is very well known and established." (*Id.*).

The Examiner further contended that "it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to make antisense of the nucleic acid sequence of SEQ ID NO: 2. The motivation of making an antisense is to control the expression of the protein encoded by SEQ ID NO: 2. One of ordinary skill in the art would have had a reasonable expectation of success since an antisense is used routinely in the art to inhibit transcription." (*Id.*)

As discussed in detail above, the present claims are entitled to priority benefit under 35 USC §§ 119 and 120 to the filing date of EP 99103382 (February 22, 1999). Thus, Wyss is not prior art to the present claims. Because the primary document relied upon by the Examiner is not prior art, the rejection is untenable and should be withdrawn.

Provisional Obviousness Double Patenting Rejection

Claims 6-15, 19-32 and 34-36 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 6-15, 19-32 and 34-36 of copending parent Application Serial No. 09/504,393. (Paper No. 10 at 13).

The Examiner asserted that "[a]lthough the conflicting claims are not identical, they are not patentable distinct from each other because they are drawn to identical nucleic acid sequences encoding the same protein, identical primers/probes, identical kits comprising said primer/probe, identical methods of using said nucleic acid sequence and vectors and host cells comprising said nucleic acid sequence." (Id.)

It is respectfully submitted that should co-pending parent Application Serial No. 09/504,393 issue as a patent, we will submit a terminal disclaimer disclaiming the terminal part of any patent granted on the present application which would extend beyond the expiration of the patent granted on the '393 application.

Accordingly, for the reasons set forth above, entry of the amendments, withdrawal of all objections and rejections, and allowance of all claims are respectfully requested. If the Examiner has any questions regarding this paper, please contact the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box. 1450 Alexandria, VA 22313-1450, on February 9, 2004.

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Respectfully submitted,

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